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EXAMINER	
NGUYEN, THU HA T	

ART UNIT	PAPER NUMBER
2155	5

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/893,364	ALLEN, ARTHUR DOUGLAS	
	Examiner	Art Unit	
	Thu Ha T. Nguyen	2155	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 June 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19 and 22-38* is/are rejected.

7)☐ Claim(s) *20-21* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. Claims **1-38** are presented for examination.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 1 recites the limitation "the flow rate of the content... the value" in lines 5-6, and 11. There is insufficient antecedent basis for this limitation in the claim.

4. Similar as to claim 4 recites the limitation "the server flow capacity...the sum of the minimum..." in lines 4-5.

Claim 6 recites the limitation "the value...", "the capacity...", "the present capacity..." in lines 17, and 22-23.

Claim 8 recites the limitation "the available bandwidth...", "the service charge...", "the service-charge-specific capacity..." in lines 7, 16, and 21.

Claim 9 recites the limitation "the future worst-case value...", "the capacity...the sequence...the present service-charge-specific capacity..." in lines 5-6, 11-12.

Claim 10 recites the limitation "the flow rate..." in lines 17, 19, 21, and 23.

Claim 11 recites the limitation "the flow rate...", "the flow rate ...the delivery of the content..." in lines 4, and 6.

Claim 12 recites the limitation "the initial value...the average consumption rate..." in lines 10-11.

Claim 13 recites the limitation "the product...the constant content flow rate...the last piece of content..." in lines 17-18.

Claim 17 recites the limitation "the cost function...the sum of the flow rates..." in lines 5-6.

Claim 20 recites the limitation "the point of intersection..." in line16-17.

Claim 25 recites the limitation "the flow varible...", "the flow favorable..." in lines 20, and 22.

Claim 26 recites the limitation "the bundled constituent sessions..." in line 9.

Claim 28 recites the limitation "the aggregate flow of content..." in line 11.

Claim 30 recites the limitation "the control variable" in line 2.

Claim 35 recites the limitation "the value" in line 4.

Claim 36 recites the limitation "the size...", "the value..." in lines 14, 15.

Claim 37 recites the limitation "the flow rate to...", "the flow rate by...", "the result..." in lines 3, 5-6.

Claim 38 recites the limitation "the amount..." in line 9.

There is insufficient antecedent basis for these limitations in the claimed language. Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claim 28, 31, 33 and 35 are rejected under 35 U.S.C. 102(e) as being anticipated by **Yin et al.**, (hereinafter Yin) U.S. Patent No. **5,982,748**.

7. As to claim 28, **Yin** teaches the invention substantially as claimed, including a system for allocating bandwidth between a server device and at least one client device, the system comprising: a call acceptance module operative to receive an incoming request for service (figure 1, element 10, col. 3 lines 20-42); a flow regulator configured to deliver content at a modulated target flow rate, the content being delivered between the server device and a respective client device when a call is accepted by the call acceptance module (figure 1, elements 16, 18-18, col. 4 lines 8-col. 5 lines 7, col. 11 lines 39-col. 12lines 2); and a flow optimizer configured to modulate the target flow rate of the flow regulator in order to optimize the aggregate flow of content (figures 1, 6, col. 4 lines 56-col. 5 lines 7, col. 7 lines 5-col. 8 lines 20).

8. As to claim 31, **Yin** teaches the invention substantially as claimed, wherein the flow optimizer is configured to determine a control variable which corresponds to an optimized flow rate (abstract, col.3 lines 20-42, col. 4 lines 56-col. 5 lines 7, col. 7 lines 5-col. 8 lines 20).

9. As to claim 33, **Yin** teaches the invention substantially as claimed, wherein the flow regulator is configured to deliver the modulated flow rate of content in response to the control variable (abstract, col.3 lines 20-42, col. 4 lines 56-col. 5 lines 7, col. 7 lines 5-col. 8 lines 20).

10. As to claim 35, **Yin** teaches the invention substantially as claimed, wherein the call acceptance module is configured to accept a call based upon the value of the control variable (abstract, figures 2-3).

11. Claim 37 is rejected under 35 U.S.C. 102(e) as being anticipated by **Schoenblum et al.,** (hereinafter Schoenblum) U.S. Patent No. **6,240,103**.

12. As to claim 37, **Schoenblum** teaches the invention substantially as claimed, wherein step (a) comprises: i) computing the sum of the minimum allowed flow rates to all active clients (abstract); ii) computing the sum of the flow rate ranges for all active clients (figure 5, col. 11 lines 45-55); iii) computing the difference between the maximum allowed aggregate flow rate and the sum of the minimum; computing a factor as the ratio of the difference over the sum of the ranges (abstract, col. 11 lines 8-46); v) if the factor exceeds 1, the control variable is set to the maximum allowed client flow rate; and vi) if the factor is less than 1, computing the control variable by multiplying the

client range by the factor and then adding the result to the minimum allowed client flow rate (abstract, col. 9 lines 16-col. 10 lines 62, col. 11 lines 33-46).

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. Claims 1-7, 10-18, 26 and 36 are rejected under 35 U.S.C. § 103 (a) as being unpatentable over **Huang et al.**, (hereinafter Huang) U.S. Patent No. **6,052,384**, in view of **Mitra et al.**, (hereinafter Mitra) U.S. Patent No. **6,331,986.**

15. As to claim 1, **Huang** teaches the invention substantially as claimed, including a method of bandwidth allocation for delivery of stored digital content from at least one server device to at least one client device by way of a network, the method comprising the steps of: a) prescribing a control variable which represents a target flow rate from the server device to each client device (abstract, col. 9 lines 54-col. 10 lines 14, col. 11 lines 20-col. 12 lines 45); b) determining time-varying constraints on the flow rate of the content (abstract, figure 2, col. 3 lines 50-col. 4 lines 34, col. 8 lines 1-col. 10

lines 26). **Huang** does not disclose the step of determining a cost function. **Mitra** discloses the step of determining a cost function of the control variables for all clients and d) prescribing bandwidth to all clients based upon the value of the control variables that maximize the cost function (figures 9-11, col. 4 lines 48-67, col. 12 lines 3-col. 14 lines 5). It would have been obvious to one of ordinary skill in the Data Processing art at the time of the invention was made to modify the method disclosed by **Huang** to include the cost function disclosed by **Mitra** because it would allow the **Huang** system to provide sufficient and optimal bandwidth allocation that maximize a cost function.

16. As to claim 2, **Huang** teaches the invention substantially as claimed, wherein step (d) comprises performing periodic computations to update the value of the control variable such that the bandwidth can be continuously allocated to each client (col. 7 lines 1-30, col. 9 lines 16-col. 13 lines 39, col. 15 lines 10-67).

17. As to claim 3, **Huang** teaches the invention substantially as claimed, wherein a new client is accepted by: i) determining an admission capacity of the bandwidth (col. 11 lines 40-col. 13 lines 67, col. 14 lines 63-col. 17 lines 59); ii) admitting a prospective client if the clients minimum allowed value of the control variable is less than the admission capacity (col. 19 lines 5-38, col. 20 lines 4-29); and iii) wherein a client admitted for service is guaranteed to have sufficient content flow over the entire session (abstract, col. 3 lines 14-col. 4 lines 34).

18. As to claim 4, **Huang** teaches the invention substantially as claimed, wherein: the admission capacity equals a server swing capacity reduced by a predetermined safety margin which may be zero, the swing capacity equaling the difference between the server flow capacity and the sum of the minimum allowed flow rate for all clients (abstract, col.11 lines 20-col. 15 lines 67, col.17 lines 12-55).

19. As to claim 5, **Huang** teaches the invention substantially as claimed, wherein the minimum allowed value of the control variable is initialized to the average consumption rate (col. 13 lines 40-col. 14 lines 45).

20. As to claim 6, **Huang** teaches the invention substantially as claimed, wherein the minimum allowed value of the control variable is initialized to the average consumption rate multiplied by a factor greater than one (col. 12 lines 8-65, col. 13 lines 40-col. 14 lines 45).

21. As to claim 7, **Huang** teaches the invention substantially as claimed, wherein the server flow capacity varies in a step-wise function over time according to a predetermined schedule and the method of accepting a new client further comprises: i) determining a sequence of future step changes of server flow capacity (col. 15 lines 10-col. 17 lines 55); ii) determining at each time in the sequence of future step changes the value for a future worst swing case capacity, the worst case swing capacity being obtained from the server flow capacity at the time by subtracting an extrapolated

present minimum allowed flow rate for all active clients that are potentially active in the future (col. 13 lines 40-col. 14 lines 63, col. 15 lines 10-col. 17 lines 55); iii) admitting a prospective client if a minimum allowed value of the control variable is less than the capacity obtained from the sequence and the present capacity (col. 15 lines 10-67); iv) whereby a new client can be admitted without compromising the service to existing clients in the presence of previously scheduled server flow capacity changes and all clients accumulate content in their buffers to the extent of their respective buffer capacity (figures 1, 5, col. 9 lines 5-col. 10 lines 24, col. 11 liens 65-col. 14 lines 62).

22. As to claim 10, **Huang** teaches the invention substantially as claimed, wherein step (b) comprises determining time-varying constraints wherein: i) an aggregate flow rate for all clients does not exceed a predetermined server flow capacity (col. 19 lines 5-26); ii) the flow rate from the server to the client does not exceed a maximum allowed flow rate for the client (abstract, col. 3 lines 14-col. 5 lines 9, col. 12 lines 8-65); iii) the flow rate to the client will never cause a buffer of the client to overflow (abstract, figures 1, 5, col. 9 lines 5-col. 10 lines 24, col. 11 liens 65-col. 14 lines 62); iv) the flow rate to the client stops when the content is exhausted (col. 15 lines 10-col. 17 lines 55); and v) the flow rate from the sever will never be less than the client's minimum allowed flow rate which may vary over time and may be zero (col. 14 lines 46-col. 16 lines 65).

23. As to claim 11, **Huang** teaches the invention substantially as claimed, wherein the maximum allowed flow rate to the client is given by the minimum of one selected from the following: i) a client flow rate ceiling (col. 4 lines 12-34); ii) the flow rate required to fill the client buffer before the next periodic computation (col. 3 lines 14-col. 4 lines 11); and iii) the flow rate required to complete the delivery of the content before the next periodic computation (col. 9 lines 6-col. 10 lines 26).

24. As to claim 12, **Huang** teaches the invention substantially as claimed, wherein: i) the minimum allowed client flow rate cannot increase over time, but may decrease such that the initial value of the control rate is no less than the average consumption rate (col. 4 lines 12-34); ii) the control variable for the client is always greater than or equal to the current minimum allowed client flow rate (col. 3 lines 14-col. 4 lines 11, col. 9 lines 6-col. 10 lines 26); and iii) the client buffer will never underflow until the content is fully consumed at the average consumption rate (col. 9 lines 6-col. 10 lines 26, col. 14 lines 46-col. 16 lines 65).

25. As to claim 13, **Huang** teaches the invention substantially as claimed, wherein the minimum client flow rate is the product of the constant content flow rate from the client to the server that causes the last piece of content to be delivered at the last possible moment as the client buffer is being drained at the average consumption rate, with a factor greater or equal to one (col. 14 lines 46-col. 16 lines 65).

26. As to claim 14, **Huang** teaches the invention substantially as claimed, wherein the minimum client flow rate is initialized to the average consumption rate (col. 13 lines 40-col. 14 lines 45).

27. As to claim 15, **Huang** teaches the invention substantially as claimed, wherein the minimum client flow rate is initialized to the average consumption rate multiplied by a factor greater than one (col. 12 lines 8-65, col. 13 lines 40-col. 14 lines 45).

28. As to claim 16, **Huang** teaches the invention substantially as claimed, further comprising the step of calculating the minimum client flow rate periodically (col. 7 lines 1-30, col. 9 lines 16-col. 13 lines 39, col. 15 lines 10-67).

29. As to claim 17, **Huang** teaches the invention substantially as claimed, wherein an aggregate flow rate and the sum of the flow rates for all clients (col. 12 lines 8-col. 13 lines 38). **Huang** does not disclose the step of determining a cost function. **Mitra** discloses the step of determining a cost function of the control variables for all clients and d) prescribing bandwidth to all clients based upon the value of the control variables that maximize the cost function (figures 9-11, col. 4 lines 48-67, col. 12 lines 3-col. 14 lines 5). It would have been obvious to one of ordinary skill in the Data Processing art at the time of the invention was made to modify the method disclosed by **Huang** to include the cost function disclosed by **Mitra** because it would allow the

Huang system to provide sufficient and optimal bandwidth allocation that maximize a cost function.

30. As to claim 18, **Huang** does not teach the invention as claimed; however, **Mitra** teaches wherein the cost function represents a service charge and is the sum of the client flow rates multiplied by the client's cost of service (abstract, figures 9, 11). It would have been obvious to one of ordinary skill in the Data Processing art at the time of the invention was made to modify the method disclosed by **Huang** to include the cost of service disclosed by **Mitra** because it would allow the **Huang and Mitra** system to calculate the maximal charge thereby maximizing the resources and minimizing the cost of operation.

31. As to claim 26, **Huang** teaches the invention substantially as claimed, wherein at least one session is a session bundle and: 1) the minimum flow constraint is computed as the sum of the minimum flow rate constraints for all bundled sessions (abstract, col. 12 lines 8-col. 13 lines 38, col. 15 lines 10-67); 2) the maximum flow constraint is the least of 1) the sum of the maximum individual flow rate constraints of each session and 2) the flow capacity of the channel shared among the bundled sessions and 3) the target flow rate is computed for the session is apportioned among the bundled constituent sessions (col. 15 lines 10-col. 16 lines 65).

32. As to claim 36, **Huang** teaches the invention substantially as claimed, including a method of bandwidth allocation for delivery of stored digital content from at least one server device to at least one client device by way of a network, the method comprising the steps of: a) prescribing a control variable which represents a target flow rate from the server to each client device based upon the amount of buffer of the client (abstract, col. 9 lines 54-col. 10 lines 14, col. 11 lines 20-col. 12 lines 45); b) b) determining time-varying constraints on the flow rate of the content (abstract, figure 2, col. 3 lines 50-col. 4 lines 34, col. 8 lines 1-col. 10 lines 26). **Huang** does not disclose the step of determining a cost function. **Mitra** discloses the step of determining a cost function of the control variables for all clients in response to the size of the client's buffer and d) prescribing bandwidth to all clients based upon the value of the control variables that maximized the cost function (figures 9-11, col. 4 lines 48-67, col. 12 lines 3-col. 14 lines 5). It would have been obvious to one of ordinary skill in the Data Processing art at the time of the invention was made to modify the method disclosed by **Huang** to include the cost function disclosed by **Mitra** because it would allow the **Huang** system to provide sufficient and optimal bandwidth allocation that maximize a cost function.

33. Claims 8-9 and 27are rejected under 35 U.S.C. § 103 (a) as being unpatentable over **Huang** U.S. Patent No. **6,052,384**, and **Mitra** U.S. Patent No. **6,331,986**, further in view of **Odlyzko** U.S. Patent No. **6,295,294.**

34. As to claim 8, **Huang** teaches the invention substantially as claimed wherein determining the server swing capacity to be the server flow capacity minus a margin and minus the sum of the minimum allowed flow rate for all clients; determining the service-charge-specific capacity to be the least of the server swing capacity and the charge specific swing capacity (abstract, col.11 lines 20-col. 15 lines 67, col.17 lines 12-55). However, **Huang and Mitra** do not teach partitioning the available bandwidth and determining service charge, **Odlyzko** teaches: partitioning the available bandwidth into partitions representing a prescribed service charge (abstract, col. 3 lines 8-26); determining a maximum-minimum capacity for a service charge to be the maximum allowed sum of all minimum allowed flow rates for all clients incurring an equal or lesser service charge, the maximum-minimum capacity equaling the sum of bandwidth allocations for all service charges less than or equal to the service charge (abstract, col. 4 lines 45-67, col. 5 lines 22-34); determinating a service-charge-specific swing capacity for a given service charge as the difference between the maximum-minimum capacity for the service charge and the sum of all minimum allowed flow rates for all clients incurring the service charge or a lesser service charge (abstract, col. 3 lines 8-col. 4 lines 67). Therefore, it would have been obvious to one of ordinary skill in the art the time the invention was made to modify the method disclosed by **Huang and Mitra** to include the concept of dividing the bandwidth into partition and prescribe the service charge for clients where higher paying clients get allocated to avoid the higher priority (higher cost) channels during heavy congestion (see abstract). As taught by **Odlyzko**, dividing a network into logical channels having graded costs will regulate traffic and limit

congestion because user who perceive that the quality of service on a lower cost channel has degraded to an unacceptable level will if they have the available resources, switch to a high cost channel which will have less traffic and hence less congestion because of its high cost (col. 3 lines 9-15).

35. As to claim 9, **Huang** teaches the invention substantially as claimed, wherein the method of accepting a new client further comprises: i) determining the sequence of future times of step changes to server flow capacity over a proposed consumption period (col. 15 lines 10-col. 17 lines 55); ii) determining for each time in the sequence of future times, the future worst-case value swing capacity, the worst case value being obtained by using the extrapolated present minimum allowed flow rate of all presently active clients that are potentially active at the time in the future (col. 13 lines 40-col. 14 lines 63, col. 15 lines 10-col. 17 lines 55); and iii) admitting a client if the minimum flow rate of the client is less than the capacity obtained from the sequence and the present capacity (col. 15 lines 10-67). **Huang and Mitra** do not teach a service charge; however, **Odlyzko** teaches the cost of service charge is based on the user selected logical channels (abstract). It would have been obvious to one of ordinary skill in the Data Processing art at the time of the invention was made to modify the method disclosed by **Huang and Mitra** to include the service charge disclosed by **Odlyzko** because it would allow the **Huang and Mitra** system to provide sufficient and optimal bandwidth allocation that maximize a cost function and optimal balance of cost.

36. As to claim 27, **Huang** does not explicitly teach the invention as claimed; however, **Odlyzko** teaches wherein the bundled session is an advertisement (col. 7 lines 44-59). It would have been obvious to one of ordinary skill in the Data Processing art at the time of the invention was made to modify the method disclosed by **Huang, Mitra and Odlyzko** to include an advertisement because it would provide an efficient and optimal bandwidth allocation to prevent bandwidth overflow/underflow.

37. Claims 19 and 22-25 are rejected under 35 U.S.C. § 103 (a) as being unpatentable over **Huang** U.S. Patent No. **6,052,384**, and **Mitra** U.S. Patent No. **6,331,986**, further in view of **Schoenblum et al.,** (hereinafter Schoenblum) U.S. Patent No. **6,240,103.**

38. As to claim 19, **Schoenblum** teaches the invention substantially as claimed, wherein: step (a) comprises: i) determining a maximum allowed flow rate and a minimum allowed flow rate for each client (abstract); ii) determining a flow rate range for each client as the difference between the maximum allowed flow rate and the minimum allowed flow rate (figure 5, col. 11 lines 45-55); and iii) initializing a current flow rate for each client as the minimum allowed flow rate and summing the flow rate into the total server flow rate (abstract); and step (d) comprises: i) computing remaining server bandwidth as the difference between the maximum server flow capacity and the total server flow rate (abstract, col. 11 lines 33-46); and ii) allocating remaining server bandwidth to remaining clients wherein all clients with a given cost of service receive

bandwidth equally to the extent of their respective ranges (figure 5, col. 11 lines 33-46). It would have been obvious to one of ordinary skill in the Data Processing art at the time of the invention was made to combine the teaching of **Huang, Mitra** to include the step of computing client flow rate and sum of flow rate range disclosed by **Schoenblum** because it would allow the **Huang and Mitra** system to provide sufficient and optimal bandwidth allocation that prevents bandwidth from overflow/underflow.

Huang and Mitra do not explicitly teach the step of no client with a given cost of service being allocated bandwidth unless all clients with a higher cost of service have received their maximum possible allocation of bandwidth. **Odlyzko** teaches a technique where each user will select a channel that provides the subjectively optimal balance of cost and perceived quality of service with the lowest cost channels presumably carrying the most traffic and the higher cost channel accordingly carrying the least traffic (abstract). Therefore, it would have been obvious to one of ordinary skill in the art the time the invention was made to combine the teaching of **Huang, Mitra, and Odlyzko** to include the concept of dividing the bandwidth into partition and prescribe the service charge for clients where higher paying clients get allocated to avoid the higher priority (higher cost) channels during heavy congestion (see abstract). As taught by **Odlyzko**, dividing a network into logical channels having graded costs will regulate traffic and limit congestion because user who perceive that the quality of service on a lower cost channel has degraded to an unacceptable level will if they have the available resources, switch to a high cost channel which will have less traffic and hence less congestion because of its high cost (col. 3 lines 9-15).

39. As to claim 22, **Schoenblum** teaches the invention substantially as claimed, wherein step (a) comprises: i) computing the sum of the minimum allowed flow rates to all active clients (abstract); ii) computing the sum of the flow rate ranges for all active clients (figure 5, col. 11 lines 45-55); iii) computing the difference between the maximum allowed aggregate flow rate and the sum of the minimum; computing a factor as the ratio of the difference over the sum of the ranges (abstract, col. 11 lines 33-46); v) if the factor exceeds 1, the control variable is set to the maximum allowed client flow rate; and vi) if the factor is less than 1, computing the control variable by multiplying the client range by the factor and then adding the result to the minimum allowed client flow rate (abstract, col. 11 lines 33-46). It would have been obvious to one of ordinary skill in the Data Processing art at the time of the invention was made to modify the method disclosed by **Huang and Mitra** to include the step of computing client flow rate and sum of flow rate range disclosed by **Schoenblum** because it would allow the **Huang** system to provide sufficient and optimal bandwidth allocation that prevents bandwidth from overflow/underflow.

40. As to claim 23, **Schoenblum** teaches the invention substantially as claimed, wherein: step (a) comprises: i) determining the maximum allowed flow rate and minimum allowed flow rate for each client (abstract); ii) determining the flow rate range for each client as the difference between the maximum flow rate and the minimum flow rate (figure 5, col. 11 lines 45-55); and iii) initializing the control variable for each client

as said minimum allowed flow rate and summing the flow rate into a total server flow rate (figure 5); and step (d) comprises: i) computing remaining server bandwidth as the difference between the maximum server flow capacity and the total server flow rate; and ii) allocating remaining server bandwidth to remaining clients to the extent of their respective ranges (figure 5, col. 11 lines 33-46). It would have been obvious to one of ordinary skill in the Data Processing art at the time of the invention was made to combine the teaching of **Huang and Mitra** to include the step of computing client flow rate and sum of flow rate range disclosed by **Schoenblum** because it would allow system to provide sufficient and optimal bandwidth allocation that prevents bandwidth from overflow/underflow.

41. As to claim 24, **Huang** teaches the invention substantially as claimed, wherein the step of allocating remaining server bandwidth further comprises the clients receiving the bandwidth equally to the extent of their respective ranges (abstract, col. 5 lines 40-col. 6 lines 12).

42. As to claim 25, **Schoenblum** teaches the invention substantially as claimed, wherein the maximized value of the control variable can be determined by: i) determining a maximum and minimum flow rate for each client (abstract); ii) determining a range between the maximum and minimum flow rates in order to find a flow rate range (figure 5, col. 11 lines 33-46); iii) determining available bandwidth by finding the difference between an aggregate flow capacity and a sum of the minimum flow rate

(abstract, col. 11lines 33-46); iv) determining a flow variable by dividing the unused bandwidth by the flow rate range; v) prescribing the control variable to be the minimum flow rate added to the flow rate range if the flow variable is less than one or prescribing the control variable to be the minimum flow rate added to the flow rate range corrected by the flow variable if the flow favorable is greater than one such that the control variable is easily calculated for each client (col. 11 lines 8-col. 13 lines 22). It would have been obvious to one of ordinary skill in the Data Processing art at the time of the invention was made to combine the teaching of **Huang and Mitra** to include the step of computing client flow rate and sum of flow rate range disclosed by **Schoenblum** because it would allow system to provide sufficient and optimal bandwidth allocation that prevents bandwidth from overflow/underflow.

43. Claims 29-30 and 32 are rejected under 35 U.S.C. § 103 (a) as being unpatentable over **Yin** U.S. Patent No. **5,982,748**, in view of **Mitra** U.S. Patent No. **6,331,986**.

44. As to claim 29, **Yin** does not explicitly teach the invention as claimed; however, **Mitra** teaches wherein the flow optimizer is configured to modulate the flow rate of the flow regulator in order to optimize charges for the content (figures 9-11, col. 4 lines 48-67, col. 12 lines 3-col. 14 lines 5). It would have been obvious to one of ordinary skill in the Data Processing art at the time of the invention was made to modify the method disclosed by **Yin** to include the step of optimize charges disclosed by **Mitra**

because it would allow the system to provide sufficient and optimal bandwidth allocation that optimize a cost function for the content.

45. As to claim 30, **Yin** teaches the invention substantially as claimed, wherein the flow regulator is configured to deliver the modulated flow rate of content in response to the control variable (abstract, col.3 lines 20-42, col. 4 lines 56-col. 5 lines 7, col. 7 lines 5-col. 8 lines 20).

46. As to claim 32, **Yin** does not teach the invention as claimed; however, **Mitra** teaches wherein the flow optimizer is configured to generate a cost function of the control variable that corresponds to a maximized value of the control variable (figures 9-11, col. 4 lines 48-67, col. 12 lines 3-col. 14 lines 5). It would have been obvious to one of ordinary skill in the Data Processing art at the time of the invention was made to modify the method disclosed by **Yin** to include the step of optimize charges disclosed by **Mitra** because it would allow the system to provide sufficient and optimal bandwidth allocation that maximize a cost function.

47. Claim 34 is rejected under 35 U.S.C. § 103 (a) as being unpatentable over **Yin** U.S. Patent No. **5,982,748**, in view of **Scheoenblum** U.S. Patent No. **6,240,103**.

48. As to claim 34, **Yin** does not explicitly teach the invention as claimed; however, **Schoenblum** teaches wherein the flow optimizer is configured to determine a maximized value of the control variable by: i) determining a maximum and minimum flow rate for each client (abstract); ii) determining a range between the maximum and minimum flow rates in order to find a flow rate range (figure 5, col. 11 lines 33-46); iii) determining unused bandwidth by finding the difference between an aggregate flow capacity and a sum of the minimum flow rate (abstract, col. 11lines 33-46); iv) determining a flow variable by dividing the unused bandwidth by the flow rate range; v) prescribing the control variable to be the minimum flow rate added to the flow rate range if the flow variable is less than one or prescribing the control variable to be the minimum flow rate added to the flow rate range corrected by the flow variable if the flow favorable is greater than one such that the control variable is easily calculated for each client (col. 11 lines 8-col. 13 lines 22). It would have been obvious to one of ordinary skill in the Data Processing art at the time of the invention was made to combine the teaching of **Yon** to include the step of computing client flow rate and sum of flow rate range disclosed by **Schoenblum** because it would allow system to provide sufficient and optimal bandwidth allocation that prevents bandwidth from overflow/underflow.

49. Claim 38 is rejected under 35 U.S.C. § 103 (a) as being unpatentable over **Schoenblum** U.S. Patent No. **6,240,103**, in view of **Odlyzko** U.S. Patent No. **6,295,294**.

50. As to claim 38, **Schoenblum** does not explicitly teach the invention as claimed; however, **Odlyzko** teaches wherein the clients are distinguished by their cost of service and bandwidth is apportioned to clients iteratively, the amount apportioned to each client in a cost category is the amount remaining from prior allocations to clients in higher cost categories (abstract). As taught by **Odlyzko**, dividing a network into logical channels having graded costs will regulate traffic and limit congestion because user who perceive that the quality of service on a lower cost channel has degraded to an unacceptable level will if they have the available resources, switch to a high cost channel which will have less traffic and hence less congestion because of its high cost (col. 3 lines 9-15). Therefore, it would have been obvious to one of ordinary skill in the art the time the invention was made to combine the teaching of **Schoenblum and Odlyzko** to include the concept of dividing the bandwidth into partition and prescribe the service charge for clients where higher paying clients get allocated to avoid the higher priority (higher cost) channels during heavy congestion (see abstract).

Allowable Subject Matter

51. Claims 20 and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

52. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure (see PTO-892 attachment)

53. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thu Ha Nguyen, whose telephone number is (703) 305-7447. The examiner can normally be reached Monday through Friday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hosain T. Alam, can be reached at (703) 308-6662.

Any inquiry of a general nature of relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-9600.

The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications.

Thu Ha Nguyen

April 14, 2004

HOSAIN ALAM
SUPERVISORY PATENT EXAMINER